

**ENGINEERING EVALUATION REPORT
SAN MATEO COUNTY FORENSICS LAB
PLANT NUMBER 14749
APPLICATION NUMBER 5914**

Background:

San Mateo County Forensics Lab. has applied to obtain an Authority to Construct and a Permit to Operate a standby engine-generator at the facility in San Mateo. The description of the engine-generator covered by this application is as follows:

**S-1 Emergency Standby Diesel Engine-Generator, Caterpillar 3306B,
DM3400-00, 382 hp, 638 cu.in., 2.46 MMBTU/hr.**

Emission Calculations:

Emission factors are taken from manufacturers data for NO_x, CO, POC, and PM₁₀. SO₂ emission factor is based on 0.05%wt. Sulfur limit for fuel. The annual operating limit of 100 hours per year excluding operation during emergency is used. This limit is based on toxic risk screening analysis results and Regulation 9-8-330.2.

PM₁₀ = TSP (Diesel Particulate) = 0.1 g/bhp-hr

CO = 0.68 g/bhp-hr

NO_x = 5.11 g/bhp-hr

POC (HC) = 0.25 g/bhp-hr

SO_x = 0.056 lb/MMBTU

PM₁₀ (Diesel Particulate)

PM₁₀ = (0.1 g/bhp-hr)(382 HP)(1 lb/453.6 g)(100.0 hrs/yr) = 8.42 lb/yr
PM₁₀ = 0.0042 TPY

Carbon Monoxide (CO)

CO = (0.68 g/bhp-hr)(382 HP)(1 lb/453.6 g)(100 hrs/yr) = 57.27 lb/yr
CO = 0.029 TPY

Nitrogen Oxide (NO_x)

NO_x = (5.11 g/bhp-hr)(382 HP)(1 lb/453.6 g)(100 hrs/yr) = 430.37 lb/yr
NO_x = 0.215 TPY

Precursor Organic Compound (POC)

POC = (0.25 g/bhp-hr)(382 HP)(1 lb/453.6 g)(100 hrs/yr) = 21.1 lb/yr
POC = 0.001 TPY

Sulfur Dioxide (SO_x)

SO_x = (0.056 lb/MMBTU)(2.46 MMBTU/hr)(100 hrs/yr) = 13.78 lb/yr
SO_x = 0.007 TPY

PLANT CUMULATIVE INCREASE:

PM10 = 0.0042 tpy

CO = 0.029 tpy

NOx = 0.215 tpy

POC = 0.001 tpy

SOx = 0.007 tpy

TOXICS EMISSIONS AND RISK SCREENING ANALYSIS:

Diesel particulates are considered toxic and emissions estimated for 100 hours of operation from the generator, S-1, are greater than the toxic trigger level (0.6 lb/yr), therefore an Air Toxics Risk Screening is required. According to risk screening analysis, the maximum cancer risk is 4.0E-6 and the risk at the nearby school is 1.2 for this operation (Ref; Interoffice toxic memo dated 11/12/02). This level of risk is acceptable under the District's risk management policy for diesel engines that meet T-BACT for reducing diesel PM. The engine meets T-BACT for diesel (0.15 g/hp-hr), and therefore the risk screen passes.

Statement of Compliance:

The engine-generator will comply with the requirements of Regulation 9-1-304. Sulfur content of diesel is less than 0.5%.

The engine-generator will comply with the requirements of Regulation 9-8-330 (hours of operations) and 9-8-530 (monitoring and record keeping). Permit condition includes these requirements.

NOx and CO emissions will be greater than 10 lb/day if the engine-generator is operated for 24 hours in one day during emergency. BACT requirements of Regulation 2-2-301 will be triggered. The engine meets BACT (6.6 g/hp-hr) for NOx and BACT (2.75 g/hp-hr) for CO (Ref.: BACT/TBACT WORKBOOK, pp 96.1.1)

Regulation 10 - New Source Performance Standard, and Regulation 11 - Hazardous Pollutants requirements are not triggered.

Because this application is ministerial (Permit Handbook Chapter 2.3), the requirements of the California Environmental Quality Act (CEQA) are not triggered.

The source is subject to the public notification requirements of Regulation 2-1-412 since there is a Juvenile Hall/Community school within 1000 feet of the source.

Permit Conditions**S-1, Emergency Standby Diesel Engine-Generator:**

- 1. The owner/operator shall operate S-1 for no more than 100 hours in any 12 month period for the purpose of reliability testing or in anticipation of imminent emergency condition. Emergency condition is failure of a regular power supply.
[basis: Regulation 9-8-330.2; Toxic risk screening analysis]**

2. The owner/operator may operate S-1 for an unlimited amount of time for the purpose of providing emergency standby power during emergency condition (as defined in Part 1). [basis: Regulation 9-8-330.1]
3. The owner/operator shall use a non-resettable totalizing counter to record hours of operation for the generator, S-1. [basis: Regulation 9-8-530]
4. The owner/operator shall use only diesel fuel with a sulfur content less than 0.05% by weight. [basis: Regulation 9-1-304]
5. The owner/operator shall maintain the following monthly records in a District-approved log for at least 2 years and shall make it available to the District staff upon request:
 - 1) total hours of operation for S-1.
 - 2) hours of operation under emergency condition for S-1 and a description of the nature of the emergency condition
 - 3) fuel usage at S-1[basis :Regulation 9-8-530]

Recommendations:

I recommend that a permit to operate be issued to San Mateo County Forensics Lab. for the source described in the background section of this report.

Exemptions:

None.

By: Dharam Singh
Air Quality Engineer